

The Alberta Journal of Educational Research

Vol. IV

1958



THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

ACKNOWLEDGMENT



This publication was made possible by funds granted by Carnegie Corporation of New York. That Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and is not to be understood as approving by virtue of its grant any of the statements made or views expressed therein.

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*Faculty of Education
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VOL. IV, No. 1

MARCH, 1958

Editor: H. E. Smith

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Editorial

Whenever a qualitative distinction is made between pure and applied research, the virtues of pure research are extolled. Pure research is disinterested and free from the taint of practicality. Its findings are uncommitted to utilitarian ends; it thrives in the air of freedom.

Apart from the fact that many significant problems in Education have a practical import, the distinction between pure and applied research is often not clear. A case in point is the Anderson study reported in subsequent pages. On the face of it—a study of fluctuation in cognitive abilities over relatively brief periods of time—this investigation has certain practical implications. It does involve questions about the constancy of the I.Q., and it does raise the issue of a single or small number of tests of any mental function. On the other hand, it is developed as pure research: it is objective, carefully structured, and (if this be virtue) its conclusions are negative.

The four other articles in this issue are practical, applied, and of immediate consequence in education. They clearly represent applied research, but research conducted in the best tradition of scientific inquiry. Rudiak's problem is that of noon-hour supervision in larger schools. Bevington presents evidence to show that mental age entrance requirements to Grade I are desirable and attended with no ill effects. Clarke sifts and summarizes a mass of data on the prediction of academic success in universities. And Hall similarly reviews the literature on acceleration as a practical device in the better education of gifted children. A subsequent issue will carry a further review by Hall on enrichment programs for the gifted. Mr. Alan Brown has reviewed a recent book, *Administrative Behavior in Education*.

EFFECT OF AGE AT TIME OF ENTRANCE INTO GRADE I ON SUBSEQUENT ACHIEVEMENT

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The Problem

At what age should children enter school?

"There is popular acceptance of the notion that age six is the time when children should enroll in the first grade. How this happened to come about is not clearly understood. Perhaps the practice evolved because six-year-old children were mature enough to leave home and to travel the necessary distance to school".¹ Undoubtedly this fact has influenced legislation with respect to entrance age in the past. Today, there are many influences within the community, such as the increased number of kindergartens, play schools, radio programs and television, which help to provide children with valuable experience and background which should make it possible for them to enter school at a younger age than children of a few generations ago. Russell² points out that the lowering of age for admission to the first grade to five and one-half years is common, in contrast to two or three generations ago, when children were often seven or eight years of age on entering school.

Educators and parents have been concerned about the advisability of the lowering of the admission age. Research in the field of educational psychology has brought about new understandings of the rate of intellectual, physical and social development of children. As a result of this new knowledge efforts have been made to correlate the curriculum and methods of instruction with these differing rates of development. These modifications have made it possible for educators and school administrators to change the entrance policies from time to time.

Before 1925 the Edmonton Public School System allowed only those children who were six or more by September 1 to enter school. Since that date six changes in the entrance requirements have been made, resulting in the present regulations which state: all children who are six years old before the first of September may enter on opening day. All other children whose sixth birthday

¹Walter S. Monroe, *Encyclopedia of Educational Research*, p. 370.

²David H. Russell, *Children Learn to Read*, p. 135.

comes on or before the last day of the following February may also enter provided they have a mental age of 5-9.³

Many parents of prospective beginners become dissatisfied with the mental age requirement of the entrance regulation when their child has been excluded. On the other hand educators feel that valuable time and accommodation would be unnecessarily used in attempting to teach children who are too immature to benefit from ordinary classroom procedures.

A comprehensive reading of articles and studies pertaining to entrance age leads one to conclude that:

1. There is very definite lack of unanimity of opinion among authorities as to what effect the lowering of entrance age has had upon the achievement of pupils.

2. There is also a very great difference of opinion as to what is the most suitable criterion upon which to base entrance requirements. Some authorities prefer only a mental age requirement but admit that if it is used there must be provision made for those children who are six years of age at time of entrance but do not have the mental ability to meet the entrance requirement. There are those authorities who believe that chronological age should be the sole criterion but point out that the curriculum must provide for individual differences, especially among the younger entrants, if financial loss to the taxpayer and personal harm to the pupil are to be avoided.

3. Where the entrance requirement is a combination of chronological age and mental age, it has been found that the younger entrants, who were able to meet the mental age requirements, achieve as well as the older entrants.

Since there is a very definite lack of unanimity of opinion among authorities concerning the most appropriate entrance age this study was undertaken to determine the effect of age at time of entrance into Grade I upon subsequent achievement of pupils in the Edmonton Public Schools. More specifically the purpose was to determine what effect chronological and mental age at the time of entrance had on subsequent achievement and pupil progress in the elementary school by comparing:

1. The standardized achievement test scores, grade six final marks, attendance records, and intelligence test scores of groups of pupils who were under six years of age at time of entrance, with groups who were over six years of age at time of entrance.

³Edmonton Public School Board Files, Entrance Regulations.

2. The number of retardations, recommendations (conditional promotions), honor standings, and accelerations of the younger entrants with older entrants.
3. The social development of the younger entrants with the older entrants as evaluated by ratings given by teachers on six personality traits.

Procedure

Chronological Age Groups

The data used in the study were obtained from an inspection of 640 completed cumulative record cards of pupils who had taken all their first six grades in the Edmonton Public School System. The information was transferred to data cards which were grouped according to chronological ages in the following manner:

UNDERAGE ENTRANTS

Group 1—5 yr. 7 mo. to 5 yr. 9 mo.

Group 2—5 yr. 10 mo. to 6 yr.

NORMAL AGE ENTRANTS

Group 3—6 yr. 1 mo. to 6 yr. 3 mo.

Group 4—6 yr. 4 mo. to 6 yr. 6 mo.

OVERAGE ENTRANTS

Group 5—6 yr. 7 mo. and over

Mental Age Sections

To obtain a comparison between the effect of mental age and chronological age at time of entrance upon subsequent achievement, the data cards for each chronological age group were subdivided into three mental age sections. The results of the Detroit Beginners First Grade Intelligence Test were used to obtain the mental ages for the following groups:

Mental Age Section A—up to 6 yr. 3 mo.

B—6 yr. 4 mo. to 7 yr. 3 mo.

C—7 yr. 4 mo. and over

Effect of Entrance Age on Achievement

During the last week of May two reading tests were given to all grade II pupils in the Edmonton Elementary Public Schools. The results of these tests were recorded on the cumulative record of each pupil. Standardized grade scores for these tests were established for the Edmonton Elementary Public Schools. The average grade II pupil would thus be expected to receive a grade score of 3.0 at the end of June.

Table I indicates the means of the grade scores of the Gates Advanced Primary Reading Tests, Type I, Word Recognition,

of 649 pupils grouped according to chronological age and mental age at time of entrance.

TABLE I

MEAN GRADE SCORES OF GATES ADVANCED PRIMARY
READING TESTS, TYPE I, WORD RECOGNITION

	Chronological Age Group						
Mental Age Sections		1	2	3	4	5	Mean
	N	113	131	156	149	91	
Sec. A	204	2.6	2.7	2.8	2.7	2.4	2.6
Sec. B	226	3.0	2.9	3.2	3.1	2.9	3.0
Sec. C	210	3.4	3.5	3.5	3.2	3.2	3.4
Mean		3.0	3.0	3.2	3.0	2.8	3.0

In Table I the difference in means between the chronological age groups does not exceed two months from the average. The difference between the means of the mental age sections is four months.

The second reading test given at the end of Grade II was Gates Advanced Primary Reading Test, Type II, Paragraph Meaning. The means of the grade scores for each chronological age group and mental age section are shown in Table II.

TABLE II

MEAN GRADE SCORES ON GATES ADVANCED PRIMARY
READING TESTS, TYPE II, PARAGRAPH MEANING

	Chronological Age Groups						
Mental Age Sections		1	2	3	4	5	
	N	113	131	156	149	91	Mean
Sec. A	204	2.7	2.7	2.8	2.8	2.4	2.7
Sec. B	226	3.2	3.0	3.1	3.4	3.0	3.1
Sec. C	210	3.5	3.5	3.6	3.4	3.1	3.4
Mean		3.1	3.1	3.2	3.2	2.8	3.1

In Table II the difference in the means of the grade scores between Group 1 and 2, the underage entrants, and Groups 3 and 4, the normal age entrants, is approximately one month. The mean of the grade scores of Group 5, the overage entrants, is three months lower than the mean of the underage entrants.

The difference in means between each mental age section is over three months.

In order to determine whether or not the difference in means between the combined grade scores of Group 1 and 2, the underage entrants, and the combined grade scores of Groups 3 and 4, the normal age entrants, is significant or due to chance errors in sampling, a statistical analysis is presented in Table III.

TABLE III

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE
IN MEANS OF GATES READING TESTS, TYPE I, WORD
RECOGNITION, AND GATES READING TESTS, TYPE II,
PARAGRAPH MEANING, FOR UNDERAGE ENTRANTS
AND NORMAL ENTRANTS

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Underage Entrants	Normal Entrants	Und. Ent.	Nor. Ent.	Arith. Means	Standard Dev'tions
Gates Test I	3.00	3.09	.62	.46	.32	4.73
Gates Test II	3.09	3.18	1.32	1.00	.31	4.57

The critical ratios of standard deviations in both tests are seen to be large, much larger than the 1.96 required to reject the null difference hypothesis. This means that significantly different variability exists between the two groups in each test. This in turn involves the use of a special formula to establish the significance of differences found between the means. The application of the Cochran-Cox formula⁴ reveals that the differences between the means (in Test I, .09; and in Test II again .09) are in neither case statistically significant.

It may therefore be assumed that chronological age at time of entrance has no significant effect upon the reading ability at the grade II level. Cron and Koontz would agree, as they report that a few months difference in age is a poor index for determining achievement of pupils in the primary grades.

⁴P. O. Johnson, *Statistical Methods in Research*, p. 75.

The difference in means of the grade scores on Gates Reading Tests, Type I (Table I) and Gates Reading Tests, Type II (Table II) between each of the three mental age sections is three months or over. The difference in means between mental age Sections A and B has been statistically analyzed to determine whether or not they are significant. The results are presented in Table IV.

TABLE IV
RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE
IN MEANS OF GATES READING TESTS, TYPE I, WORD
RECOGNITION AND GATES READING TESTS, TYPE II,
PARAGRAPH MEANING, FOR MENTAL AGE SECTIONS
A AND B

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Section A	Section B	Sec. A	Sec. B	Arith. Means	Standard Deviations
Gates Test I	2.71	3.06	.53	.66	4.57	1.00
Gates Test II	2.77	3.10	.96	.73	3.33	.40

The figures in Table IV show that difference in means of .35 obtained from the Gates Tests I and .33 from the Gates Tests II yield critical ratios of 4.57 and 3.33 respectively. Garrett⁵ considers a critical ratio which is greater than 1.96 at .05 level of confidence as being a significant difference in the means. The critical ratios of 1.00 and .40 for the standard deviations as found in Table IV indicate that the variability of the two groups is not significant at the .05 level of confidence.

It is thus shown that there is a significant difference in the average achievement between the mental age sections at the grade II level. Therefore, mental age at time of entrance seems to be a determining factor in subsequent achievement, particularly in the field of reading.

These findings are corroborated by Morphett and Washburne⁶ who find that there is a correlation ranging from .50 to .65 between mental age and ability to learn to read.

⁵Henry E. Garrett, *Statistics in Psychology and Education*, p. 216.
⁶M. V. Morphett and C. Washburne, *Results of Practical Experiments in Fitting Schools to Individuals*, pp. 496-503.

The data used also included the results of two standardized tests given at the grade IV level and two at the grade VI level and averages of the marks for six subjects tested at the end of grade VI. A careful analysis of these test results indicates the same trend as has been demonstrated at the grade II level.

It seems evident from the data used in this study that success in the elementary school is dependent upon the mental age at the time of entrance. Children who are only five and a half years old at the time of entrance, but have the required mental age of 5.9 will succeed as well as children who are a year older chronologically but have not reached the required mental age.

This fact is further evident, especially in Table I and II, in the scores for Group 5, the overage pupils. Most of the pupils included in this group were excluded the first time they tried to enter school because their mental age was below the 5.9 required for entrance. Therefore they were a year older at time of entrance than they should have been, yet were unable to achieve as well as pupils in the other four groups. This fact alone seems to be justification for a combination of chronological age and mental age requirement in the entrance regulation.

Since attendance is one factor affecting achievement the attendance for all the pupils in each group for each of the first six years they attended school was averaged. It was found that there was no significant difference in the average attendances among the five groups. It then may be concluded that the younger entrants were physically able to attend school as regularly as older entrants.

Effect of Entrance Age on Pupil Progress

The extent to which chronological age and mental age at time of entrance influence the progress of pupils in the Edmonton Elementary Public Schools throughout the first six grades was determined by comparing the number of retardations (failures) recommendations, regular promotions, honor standings and accelerations in each of the chronological age groups and mental age sections.

The number and percentage of retardations in each chronological age group and mental age section are shown in Table V.

Chronological age at time of entrance does not appear to have any marked effect upon the number of retardations. The combined percentage of retardations for Groups 1 and 2 (the underage entrants) are practically the same as the combined percentage for Groups 3 and 4 (the normal age entrants). However Section A, the lowest mental age section, has over six times as many retardations as the highest mental age section.

TABLE V
NUMBER AND PERCENTAGE OF RETARDATIONS

Mental Age Sections	Chronological Age Groups					Total	%	
	1	2	3	4	5			
	N	113	131	156	149	91	640	
Section A	204	14	32	24	25	18	113	55
Section B	226	5	13	22	1	5	46	20
Section C	210	3	2	9	1	4	19	9
Total	640	22	47	55	27	27	178	
%		19	36	35	19	30	28	

These figures point out quite clearly that mental age at time of entrance and not chronological age is the determining factor in the number of pupils who will be required to repeat grades.

The data used in the study indicate approximately the same trend in the number and percentage of recommendations as for retardations. This again points to the fact that achievement in subsequent grades is influenced by the mental age at time of entrance and not chronological age.

When the number of honor standings awarded was considered, it was found that the pupils in the normal age group received slightly more than those in the underage group even though the average intelligence quotient for the underage entrants was slightly higher. This would seem to indicate that children who are slightly older are able to reach a higher standard of attainment. This finding is further substantiated when the number of accelerations was considered: it was found that eight pupils, or 1.25 per cent of the 640 pupils were accelerated once in the first six grades and six of these accelerated pupils were in the normal age and none in the underage group. However all accelerated pupils were in the highest mental age section.

Effect of Entrance Age on Personality Development

Learning ability is not predictable solely in terms of similarity in intelligence and rate of maturation. Differences in achievement can, in many cases, be attributed to the personality of the learner.

Children of widely varied backgrounds are expected to make

adjustments to entirely new situations when they enter school. The rate and direction of this adjustment will depend to a large extent upon the chronological and mental age of the entrants. Children too immature to cope with the strains and tensions necessarily encountered in day-to-day school situations may have difficulty in developing desirable personality traits. Those who are older chronologically or mentally than the average at time of entrance may find a lack of challenge and thus develop undesirable personality traits. While it is recognized that personality is one of the most subjective phases of pupil development which the school endeavours to measure, nevertheless, the school must be cognizant of the effect of personality development upon pupil progress and achievement.

The Edmonton Public School System has endeavoured to evaluate and record on the cumulative records the personality development of each child at the end of each term on the following six traits:

1. *Emotional Control*

The child who is developing in emotional control will accept criticism cheerfully and use it to improve himself. He will develop powers of self-direction and control over his emotions. He will accept and respect authority or direction and abide by group decisions.

2. *Creativeness*

It is that attitude of expressing or constructing in one's unique way what one feels, thinks, or sees. It is akin to originality.

3. *Judgment*

This implies the development of open-mindedness. In developing this attitude the child will learn to observe and experiment, to use knowledge gained from previous experience, to weigh evidence and to form and test conclusions.

4. *Co-operation*

The ability to share ideas and possessions with others. The ability to work with groups willingly either as a leader or co-worker.

5. *Dependability*

A child who is developing a sense of responsibility will be sincere, trustworthy and dependable. He will be aware of the obligations of a promise and will learn to accept the consequences of his actions.

6. *Courtesy (Social Concern)*

A child who is developing social concern shows consideration for the rights and feelings of others, is thoughtful and polite.

The rating of these traits is done on a 4-point scale. The instructions given to teachers state that: "1"—"Very Good" will be awarded infrequently and only in those cases where behavior is well above average. The average pupil will rate "2"—"Good"; a smaller number will rate "3"—"Fair"; and only a few poorly adjusted pupils would ordinarily need to be rated "4"—"Poor".

The purpose here was to determine the effect of age at time of entrance on the personality development by comparing the rating given for:

1. Pupils in Groups 1 and 4 who made normal progress during the first six grades.
2. Pupils in Groups 1 and 4 who were retarded one or more years during the first six grades.
3. Pupils in these two groups at the grade I level and again at the grade IV level to determine whether or not the younger entrants were able to maintain the same rate of adjustment as the older entrants.

The data compiled clearly indicate that chronological age at time of entrance has very little effect upon personality development of pupils making normal progress. However, it does indicate that pupils in the higher mental age sections are awarded higher ratings on all six traits.

When the personality traits of the retarded pupils (repeaters) were compared with those making normal progress, it was found that the latter received higher ratings. The difference was the same in both chronological age groups.

Pupils in the two groups received lower ratings at the grade I level than at the grade VI level but here gain there was no difference when chronological ages were considered. The figures obtained all seem to point to the fact that the pupils in the lower mental age sections do not seem to be as well adjusted socially as those in the higher mental age sections.

Conclusion

This investigation clearly indicates that a combination of chronological and mental age is desirable in the entrance regulations. The chronological age regulation is necessary since some children with low mental ability would not be able to enter until they were seven or eight years of age, if mental ability were the sole criterion. The minimum mental age requirement is necessary unless a more

adequate differentiated program is provided to meet the wide range of abilities encountered in the primary grades.

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NOON-HOUR SUPERVISION IN ALBERTA SCHOOLS TO WHICH PART OF THE PUPILS ARE CONVEYED

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The Problem

The centralization of schools in Alberta in recent years has created some urgent problems in noon-hour supervision. By *supervision* is meant democratic direction and guidance of student activities to the end that they promote physical, social, moral and emotional development. The pressing need for supervision becomes apparent when it is realized that many pupils bring their lunches to school and are left free time during the noon-hour. Some pupils will use this time for study; some will gather for noisy conversation. "Many others, bored and restless, will go looking for 'things' to do. And often as not, they'll start running around the halls and rooms, causing disturbances and upsetting the school routine."¹

What should be done with a large group of children during the noon-hour? What kind of supervision is necessary? How many teachers should be on duty? What can be done about teachers' resentment to such duties? "Can we devise a lunch period situation that will adequately meet the needs of children and at the same time provide a much needed rest for the teacher?"²

These questions and others prompted this study. The purposes were (1) to ascertain the current practices in noon-hour supervision in Alberta centralized schools; (2) to obtain reactions of classroom teachers and parents to various problems of noon-hour supervision; and (3) to suggest how centralized schools might best handle the problem of noon-hour supervision.

Review of the Related Literature

The literature applicable to this study deals with practices in noon-hour supervision in American centralized schools.

Supervision of lunch rooms and cafeterias

In some schools noon-hour duties are reduced by curtailing the noon period to the actual time required to eat lunch. Gartrell³ favors this practice, but he is not supported by Miller, Moyer and

¹C. E. Anderson, "Supervised Noon-Hour Coach", *Scholastic Coach* (September, 1952), p. 48.

²M. Kalish, "The Void in the School Day," *School Executive Magazine* (May, 1952), p. 127.

³S. K. Gartrell, "One Solution to the Noon-Hour Dilemma," *Ohio Schools* (January, 1954), p. 28.

Patrick⁴ nor by an article which states: "Scientific tests show that not only is the afternoon performance improved by the elongated lunch hour, but that the teacher herself is less fatigued at the end of the day."⁵ Brackett⁶ has found that in large schools staggered lunch periods reduced hall congestion and minimized organizational detail. Hatfield and Lowe⁷ and Nancarrow⁸ recommended this practice. Other authorities⁹ advocate that teaching desirable food selection and correct eating habits should be the principal goals of the school lunch program. The literature¹⁰ also supports the view that teachers should have relief from noon-hour duties while they are having lunch themselves. This relief is realized in some schools by having parents¹¹ take turns in providing soup, and in others by having mothers¹² supervise lunch period.

Supervision of playgrounds

According to the literature at least five factors are inherent in the supervision of playgrounds. Trethaway¹³, Kilroy¹⁴ and McCooe and Hutchinson¹⁵ advocate that playgrounds should be divided into areas for designated activities for both primary and upper grade children. Moreover, these authorities state that the various activities undertaken should be scheduled. Axtell and Robinson¹⁶ and Watrous¹⁷ recommend that noon-hour activities be planned democratically by pupils and teachers. Kilroy¹⁸ suggests that pupil leaders be asked to assist teachers to supervise the playground. Finally, Axtell and Robinson¹⁹ state that all teachers should be

4F. A. Miller, J. H. Moyer, and R. B. Patrick, *Planning Student Activities*, p. 303.

5"A Lunch Program: An Example of Good Living," *The Instructor* (March, 1949), p. 16.

6R. D. Brackett, "The Staggered Lunch Hour Plan," *The American School Board Journal* (September, 1955), pp. 41-42.

7E. F. Hatfield and J. Lowe, "I Dreaded Noon Hour," *American Association of Health, Physical Education and Recreation Journal* (December, 1955), p. 29.

8J. E. Nancarrow, "Staggered Schedule, Faster Service," *The Nation's Schools* (July, 1957), pp. 78-80.

9"Committee on Problems of the Lunch Hour," *Baltimore Bulletin of Education* (November, 1954), p. 20; R. B. Norris, "Make Better Use of the Midday Break," *The Nation's Schools* (August, 1948), p. 57; "Lunch Period Has a Classroom Tie-In at Orange," *Texas Outlook* (December, 1949), pp. 23-25.

10"Committee on Problems of the Lunch Hour," *op. cit.*, p. 23; "Lunch Time—Program or Problem," *New York State Education* (March, 1955), p. 411.

11"A Lunch Program: An Example of Good Living," *op. cit.*, p. 16.

12J. E. English, "Parents Take Over at Lunch," *School Executive Magazine* (December, 1954), pp. 107-08.

13E. H. Trethaway, "Don't Just Turn Them Loose," *National Education Association Journal* (April, 1954), p. 214.

14T. J. Kilroy, "Child Leaders Take Over Noon-Hour Playground," *The Nation's Schools* (January, 1951), p. 53.

15D. L. McCooe, Jr. and C. E. Hutchinson, "An Experiment in Noon-Time Recreation," *The Education Digest* (December, 1951), p. 20.

16W. B. Axtell and D. E. Robinson, "What Makes a Good Noon-Hour Program," *The Nation's Schools* (September, 1949), p. 31.

17M. L. Watrous, "Pupil Participation in Improvement of Noon-Hour Activities," *National Elementary Principals* (September, 1954), p. 212.

18Kilroy, *op. cit.*, pp. 53-54.

19Axtell and Robinson, *op. cit.*, p. 31.

available for assignment as noon-hour supervisors. It is interesting to note that in some American elementary schools²⁰ the noon supervisors are parents not teachers.

Organization and supervision of indoor activities

The keynote to the organization of noon-hour indoor activities is pupil-staff participation in planning and scheduling activities. This approach is strongly recommended by Anderson²¹ and Gribble²². Axtell and Robinson say: "If the children are encouraged to participate in planning noon-hour activities, they will feel that they are doing what *they* want to do."²³ Tilton²⁴ recommends a noon-movie program as the main indoor activity, especially during inclement weather. Gribble²⁵ and Norris²⁶ state that indoor activities should be supervised by teachers.

Method of Procedure

Three sets of questionnaires were developed as instruments for collecting data. Ninety questionnaires were mailed to principals of Alberta centralized schools in which three or more high school teachers were engaged and in which twenty per cent or more of the pupils were conveyed; one hundred and twenty were sent to teachers of centralized schools in ten selected school divisions; and one hundred were distributed to selected parents of two centralized school districts. Over ninety-three per cent returns were received in each case.

The main questionnaires which were sent to principals were prepared after careful study of the related literature. The suggestions given by Good and Scates²⁷ were used as far as possible. The questionnaires were criticized for validity by the thesis committee and by ten principals of centralized schools; two revisions were made.

The questionnaires mailed to principals sought information on the following: functions of noon-hour supervision; arrangements for supervising the school and playgrounds, lunch rooms, indoor activities, and sports; arrangements for allowing conveyed students to go up town at noon; type of equipment and accommodation avail-

20G. Vanderbilt, "Mothers' Corps provides Noon Relief for Teachers," *Wisconsin Journal of Education* (April, 1954), p. 10.

21Anderson, *op. cit.*, pp. 48-51.

22B. Gribble, "Noon Recreation," *School Activities* (November, 1952), pp. 109-10.

23Axtell and Robinson, *op. cit.*, p. 31.

24J. S. Tilton, "Organization of a Noon-Movie Program," *Audio Visual Guide* (November, 1954), p. 34.

25Gribble, *op. cit.*, pp. 109-10.

26Norris, *op. cit.*, p. 56.

27C. V. Good and D. E. Scates, *Methods of Research*, pp. 604-34.

able; and methods used to obtain staff co-operation for noon-hour supervision.

The questionnaires sent to teachers were designed to reveal the nature of their duties; the time spent in carrying out these duties; complaints regarding noonhour duties; opinions on the functions of supervision; and opinions on ten problems inherent in noon-hour supervision.

The questionnaires distributed to parents sought to determine whether they favored hot lunches in school; whether they would take turns to prepare lunches, and supervise the play activities of the elementary pupils; and their opinions on ten problems related to noon-hour supervision.

Findings from Principal's Questionnaires

General information

Of the eighty-four schools surveyed, ten had fewer than ten classrooms; sixty-three had between ten and twenty-four classrooms; and eleven had twenty-five or more classrooms. Twenty-four schools employed three high school teachers; twenty-three employed four; eighteen employed five or six; fourteen employed seven or eight; and five employed eleven to eighteen.

In seven schools the enrolment was below 199 pupils; in sixty-four, between 200 and 599; in thirteen, 600 or more. Eight schools conveyed less than thirty per cent of the pupils; sixty-four conveyed between thirty and seventy-nine per cent; twelve conveyed between eighty and ninety-nine per cent.

General noon-hour supervision

In most schools the arrangements for noon-hour supervision were arrived at by unanimous agreement or majority vote of the staff and principal, or by mutual agreement between the board and staff. In eight schools, however, noon-hour supervision was the result of arbitrary order of the principal, superintendent or board. The use of arbitrary order appears questionable: "Authority can lead a horse to water but cannot make him drink."²⁸

The places most frequently supervised, in order of frequency, included: hallways; playgrounds; gymnasiums; all classrooms; only designated classrooms; libraries; and washrooms. In most schools the supervision was carried out by all members of the staff, who took turns on a daily or weekly basis according to prepared schedules; in a few schools assistance was obtained from pupils and janitors.

²⁸J. B. Sears, *The Nature of the Administrative Process*, p. 540.

Approximately three-quarters of the schools surveyed required their pupils to obtain permission to go up town at noon. The permission was in the form of written notes from parents, personal permission from the principal, or from the home-room teachers. Some schools had devised checks to prevent abuses of the privilege of going up town.

The functions of noon-hour supervision, as seen by principals, in descending orders of importance are:

1. To preserve order and discipline
2. to protect pupils from accidents
3. to guide pupils into worthwhile activities
4. To protect school property
5. To develop pupils socially
6. To provide protection against legal liability
7. To be on call to settle difficulties.

It is interesting to note that teachers ranked the functions in the same order. According to Norris²⁹ and Axtell and Robinson³⁰, however, functions three and five should head the list.

Lunch supervision

Most principals stated that they assigned lunch rooms which were supervised by teachers, responsible students, janitor or principal. It is significant to note that no schools obtained assistance in lunch supervision from parents. Only seven of the eighty-four schools surveyed provided hot lunches which consisted of either soup or cocoa. In most schools the time allowed for eating lunch was fifteen or twenty minutes. The majority of schools required their pupils to wash and tidy up before lunch. This requirement was enforced by teachers in home-room classes or by supervisors on duty. In approximately half of the schools the lunch rooms were cleaned up by pupils supervised by teachers.

Noon-hour indoor activities

More than half the schools surveyed had a noon-intermission only one hour long; only five schools allowed one and one-half hours. The majority of the schools planned the indoor activities with their pupils. Table I shows the number of schools which provided various indoor activities as well as the number of schools which employed schedules. The table indicates that a considerable number of the indoor activities were not scheduled.

Sixty-five schools had gymnasiums. The three most popular activities in gymnasiums were basketball, volleyball and badminton.

²⁹Norris, *op. cit.*, p. 56.

³⁰Axtell and Robinson, *op. cit.*, p. 29.

TABLE I
INDOOR NOON-HOUR ACTIVITIES, SOME OF WHICH WERE
SCHEDULED, IN EIGHTY-THREE* ALBERTA CENTRALIZED
SCHOOLS

Activity	No. of Schools	Scheduled (No. of Schools)
Ping Pong	64	40
Volleyball	59	48
Basketball	55	45
Checkers	36	12
Square dancing	27	19
Chinese checkers	26	10
Snakes and ladders	24	8
Ring toss	24	8
Badminton	24	21
Noon films	23	15
Tumbling	19	14
Social dancing	18	12
Folk dancing	13	10
Indoor curling	13	6
Music listening	13	4
Boxing	4	2
Tap dancing	3	3
Band training	2	2
Wrestling	1	0
Cheer leading	1	1
Operetta	1	1
Glee club	1	1
Dodge ball	1	0
Crokinole	1	1
Bingo	1	1
Floor hockey	1	1
Rubber horse shoes	1	1
Chess	1	0

*One school did not have any of these activities.

Table II shows the supervisory personnel of the indoor activities. A considerable number of schools made use of student supervisors; some schools did not supervise the indoor activities at all.

The majority of schools encouraged the withdrawing type of student to take part in at least one activity. According to the literature³¹ this is very important. In more than half the schools the games and equipment were issued and collected by responsible students. This practice is supported in the literature³². The

³¹Ibid.

³²McCooe and Hutchinson, *op. cit.*, p. 20; Trethaway, *op. cit.*, p. 214; Kilroy, *op. cit.*, p. 53.

majority of principals stated that some staff meetings were devoted to an evaluation of noon-hour activities; and that when changes were contemplated the students were consulted first.

TABLE II
SUPERVISORY PERSONNEL OF INDOOR NOON-HOUR
ACTIVITIES* IN EIGHTY-THREE ALBERTA CENTRALIZED
SCHOOLS

Activity	Supervised by (No. of Schools)		
	Staff	Students	No one
Ping pong	37	25	12
Volleyball	48	9	6
Basketball	45	14	5
Checkers	7	11	18
Square dancing	23	4	0
Chinese checkers	4	7	16
Snakes and Ladders	4	6	14
Ring toss	6	5	14
Badminton	21	6	2
Noon films	20	5	1
Tumbling	18	1	0
Social dancing	15	4	2
Folk dancing	11	3	0
Indoor curling	6	2	5
Music listening	3	6	4

*This table includes only a partial list of activities.

Outdoor sports activities

In this study sports activities were examined from the point of view of whether they were coached by teachers or not. There is another study³³ under way which will treat this topic more fully. The sports coached by junior or senior high school teachers were: softball; curling; hardball; hockey; touch rugby; soccer; and broomball.

School equipment

Almost all the schools surveyed have movie and filmstrip projectors, record players and radios; approximatey half the schools have tape recorders and P.A. systems. These make noon shows, dancing and music listening possible noon-hour activities. Seventeen schools have inter-room communication systems. The writer

³³“Current Practices in Extracurricular Activities in Alberta Centralized Schools,” by Steve Boyko.

believes that these are a great asset for noon-hour supervision in the larger schools.

Teachers' Views of Supervision

Nature of duties

According to the questionnaires received all teachers, regardless of grades taught, were responsible for one or more of the following duties: supervising lunch rooms, home-room classrooms, all classrooms on one floor, one or more buildings, one or more playgrounds; acting as school librarian or custodian of games and equipment; being on call to settle difficulties. However, with very few exceptions, only junior and senior high school teachers were responsible for coaching sports.

Time spent

About three-quarters of the teachers surveyed were on duty for one hour and a half or less on a per week basis. Thirty teachers were on duty for two hours or more; eleven of these supervised five hours each week. Five hours of noon-duty per week appears very unreasonable.

Staff meetings

About three-quarters of the teachers stated that their principals held some staff meetings during which the noon-hour activities were planned and duties assigned. Most of these teachers felt that these meetings were either highly or moderately democratic. According to Wiles³⁴ and Bartky³⁵ democratic meetings are conducive to good staff morale and to good human relations.

Complaints about supervision

The three complaints with highest frequencies were: there is no remuneration; it is unfair to give up the time needed for one's own lunch; and the public demands too much of teachers. About one-third of the teachers complained that duties were not clearly defined and that duties were not assigned equally to all teachers. Twenty teachers stated that they had no complaints at all.

Opinions about supervision

Table III summarizes teachers' opinions on various aspects of supervision. The table shows that only eight teachers felt that their noon-hour program gave their pupils something worthwhile to do. This, perhaps, may be ascribed to the fact that the equipment was inadequate. Only twenty-five teachers felt that they could be partly relieved from noon-duty by parent help

³⁴K. Wiles, *Supervision for Better Schools*, pp. 68-69.

³⁵J. Bartky, *Supervision as Human Relations*, p. 23.

and thirty-six believed that pupils who participated in noon-hour activities do better in school work.

TABLE III
OPINIONS OF 122 TEACHERS ON VARIOUS QUESTIONS
OF NOON-HOUR SUPERVISION

Question	Opinion (No. of Teachers)		
	Yes	No	Undecided
Does your staff accept noon-hour duties willingly?	63	27	22
Are facilities and equipment adequate for varied noon-hour activities?	18	90	4
When changes are made in the supervisory program which stand to affect you, are you consulted first?	80	11	21
Should noon-hour activities be scheduled?	82	18	12
Is the time you are required to spend on noon-duty reasonable? ...	73	23	16
Does the time you spend on noon-duty present special hardships or sacrifices?	54	50	8
Does the noon-hour program give all the pupils in your school something worthwhile to do?	8	94	10
Could you be relieved of noon-duties partly by parent help?	25	46	41
Should conveyed pupils be allowed to go up-town without permission?	5	107	0
Do pupils who participate in noon-hour activities do better in their school work?	36	23	53

Parents' Views of Supervision

Hot lunches

About seventy per cent of the parents expressed themselves in favor of hot lunches for which they would be willing to pay. About one-quarter of the parents indicated that they would be willing to

take turns to prepare hot lunches in school. In this respect, only two parents expressed willingness to supervise the play activities of the pupils in elementary grades.

Opinions about supervision

TABLE IV
OPINIONS OF NINETY-FOUR PARENTS ON VARIOUS
QUESTIONS OF NOON-HOUR SUPERVISION

Question	Opinion (No. of Parents)		
	Yes	No	Undecided
Should all pupils be encouraged to participate in noon-hour activities?	81	5	8
Should teachers be paid extra for noon-hour supervision?	16	52	26
Should high school teachers who coach sports be compensated by teaching fewer credits?	18	44	32
Should teachers have their lunch period free of supervising pupils? ...	43	26	25
Are you kept informed of the noon-hour program carried on in your school?	48	41	5
Would you support the school board's spending more money on games and equipment for noon-hour activities?	58	18	18
Do your children like the noon-activity program provided by your school?	57	22	15
Should you help correct unfounded criticism of your school's noon-activity program?	41	10	43
Are children who participate in noon-hour activities better students in school?	68	8	18
Would you like the school board to hire special supervisors to look after noon-hour supervision?	9	55	30

Table IV summarizes parents' opinions on questions related to noon-hour supervision. The table indicates that the parents surveyed are opposed to paying teachers extra for noon-hour supervision and to the other forms of compensation suggested. The situation is the same with respect to hiring special supervisors. It is interesting to note that over seventy per cent of the parents surveyed believe that the children who participate in noon-hour activities do better in school. Table III indicates that only about thirty per cent of the teachers hold the same view.

Conclusions and Recommendations

Conclusions

The conclusions listed below are based on the findings from the questionnaires received from principals, teachers and parents.

1. Noon-hour supervision has been accepted by almost all Alberta centralized schools as a necessary duty.
2. Most principals practice good human relations with their staffs.
3. Principals and staffs are themselves responsible for the following two quite common complaints about noon-hour supervision: the duties are not clearly defined, and some staff members have less than their fair share of noon-duty.
4. Most schools have adequate equipment for at least three worthwhile activities: noon shows, dancing and music listening. But the facilities for preparing hot lunches appear to be practically non-existent.
5. Parent education is necessary in order that parents accept the contention that teachers should be remunerated, or compensated otherwise, for the time spent on noon-duties.
6. A considerable number of schools do not schedule activities.
7. Principals and teachers believe that supervision should stress discipline more than social development.
8. There is consensus among principals, teachers and parents that pupils should obtain permission if they want to go up town at noon.
9. An interesting possibility exists in parents' willingness to take turns in preparing hot lunches in school.
10. The noon-hour program in those schools which plan noon-hour activities with their pupils and hold evaluative staff meetings are superior to those found in schools where this is not done.

Recommendations

This study does not pretend to give solutions for all the problems that may arise during the noon-hour. This cannot be done as each school has its own unique problems. However, the writer feels that the following recommendations can be used as a starting point to develop a noon-hour program of high quality.

1. The noon-hour program should be planned early in the school year, every year, by the staff and pupils.
2. Most of the activities, if not all, should be scheduled.
3. The noon-intermission should be not less than one and one-half hours long.
4. All teachers should be available for supervision, including the principal.
5. Adequate steps should be taken to protect pupils from accidents and to protect school property.
6. Parents should be kept informed of the noon-hour program.
7. Responsible students should be asked to assist teachers with routine noon-hour duties.
8. Eating lunch should be considered one of the most important noon-hour activities.
9. The whole staff should participate in developing and stating the purposes of the noon-hour program. Emphasis should be placed on socialization among pupils. Supervision must facilitate pupil development; this is its primary justification.

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REVIEW OF SOME PREVIOUS STUDIES ON MATRICULATION PROBLEMS*

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The Problem

At the 1954 National Conference of Canadian Universities the problem was posed by T. H. Mathews, Registrar of McGill University, as follows: "Who should go to a Canadian University?"¹ This question implies a number of others: Should a university have an admission policy or only admission requirements? What are the causes of university failure? Can university success and failure be predicted? How many university graduates does a flourishing Canadian society require? In what proportions should university education be vocational, professional, and liberal? What is the appropriate content and level of matriculation preparation? To what extent is society prepared to induce, persuade, or coerce young people to attend university if they seem unwilling to apply? Some of these questions are amenable to study, while others involve agreement as to goals and values.

The broad aspects of the problem of articulation between the high schools and university have received considerable attention. Thus Hollingshead² notes that in the United States, "We are now giving a higher education to slightly more than two fifths of those in the top quarter of ability. The ideal, of course, would be to increase this proportion as nearly as possible to 100 percent." His report considers early identification of potential college students, scholarships and other devices to induce them to attend college, the role of the community college, and methods of financing an expanded higher education. The most recent in a series of documents³ prepared by the College Entrance Examination Board staff (Princeton, New Jersey) has this to say of the U.S.A.:

The Nation's inadequate supply of engineers, scientists, professionals, and semi-professionals in many areas; the growing conviction that our colleges and universities are the most important sources of trained intelligence; and the developing awareness that youthful talent is being wasted—all these combine to focus attention on higher education. Furthermore, increased demands for trained intelligence are coming from the professions, vocations, business, agriculture, and labor.

*This is the second in the series of papers on Matriculation problems. The first was reported in June, 1957.

¹Proceedings of the National Conference of Canadian Universities, 1954, p. 19.

²Byrons S. Hollingshead, *Who Should Go to College?* p. 130.

³College Admissions—The Student from School to College, College Entrance Examination Board, p. XII.

The Canadian problem has similarly received attention. Thus, Dr. J. A. B. McLeish writing in *Saturday Night* (September 15, 1956) on the topic "Who Should Go to College?" has this to say about the proportion of Canadians who might go:

If it is true that roughly a quarter of our school population has at least the I.Q. level of 110, and if—as in Ontario—only 3 per cent of the youngsters entering elementary school ultimately graduate from university, then it would seem that we are failing to educate a large number of 'first class' young people at the 'summit' end of education, and further, that our definition of 'first class' is simply too narrow.

He then proposes the best selection, guidance, and financial aid possible for the "good" youngster (as opposed to the 'first class' youngster).

Factors related to scholastic success have been studied intensively over the years. The most common method has been to correlate two or more factors with university marks. It is now known that the relationship found is dependent on several conditions.

1. The validity and reliability of the university marks. (A correlation between two measures cannot exceed the square root of the product of the reliability coefficients of the two measures.)

2. The validity and reliability of the measured factor. (Measure of persistence, motivation, methods of study, and the like, are seldom accurate. In general, personality factors may show low correlations with marks for this reason.)

3. The range of talent. Correlations are higher when the range of talent is great, and lower for narrow ranges of talent. (This contributes to the difference between correlations above 0.60 between end of first year university marks and scores on the Ohio State Psychological Examination at a university which must admit all Grade XII graduates and correlations of about 0.20 in another institution which admits only Grade XII graduates who have high standings.)

4. The varied patterns of courses students may take in university. (High school average may not be related to a science pattern in the same way as it is related to a language pattern. Within each pattern, high school average may not be related in the same way to different university courses.)

The general problem of university matriculation is to *select* those capable of profiting from a university education (not missing any capable of profiting and not including any not capable of profiting); to *induce* those found capable of attending to do so; and to *place* them in university curricula in which they will be most successful.

Review of Related Research to 1949

In the 1949-1950 issue of the *Journal of Experimental Education*, Harley E. Garrett⁴ reviewed studies prior to that date. This exhaustive survey of the literature is summarized in terms of the factors studied.

High School Average

Garrett summarized thirty-two studies which correlated high school averages with university success. The range of r was from 0.29 to 0.83 with a median of 0.56. After examining these studies, Garrett noted that uniform high school gradings tend to increase the correlation; that generally the correlation is higher for short time periods (end of first year of university) than for longer time periods (two or three years of university); and that the pattern of high school subjects is not correlated significantly with university marks. The various studies indicated that high school average alone is better at predicting university success than any of the following alone: College Entrance Examination Board Scores (at Harvard, Yale, etc.); high school rank, quartile rank, or other ranks; achievement tests; or intelligence tests. Garrett concluded that "among all the factors contributing to prediction of scholastic success in college, the student's average grade in high school continues to show the highest correlation with later college scholarship average".

Standardized Tests

The twenty-four studies which correlated College Entrance Examination Board scores with university results showed a range of r from 0.23 to 0.85 with a median of 0.49. The fifty-seven studies which related standardized tests in specific areas such as English, chemistry or reading to subsequent university grades yielded correlations from 0.10 to 0.70 with a median of 0.40. A few examples illustrate specific findings: the correlation between university marks and a standardized test in Latin was 0.63; with French 0.57; with Reading 0.42; with Mathematics 0.42; with Social Studies 0.39; with Science 0.35; with Reading Comprehension 0.34. In one rather interesting study quoted by Garrett, Durflinger found a correlation of 0.47 between elementary school achievement and university average. The British eleven plus examination rests its case on this early identification.

Scholastic Ability

Garrett found ninety-four studies which reported correlations from 0.17 to 0.67 between subsequent university marks and scores

⁴Harley E. Garrett, "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Science and Teachers Colleges", *Journal of Experimental Education*, (Volume 18, 1949-50), pp. 91-138.

on general mental ability tests. Such tests include the American Council on Education Psychological Examination, the Ohio State Psychological Examination, and the Otis Self-Administering Test of Mental Ability. The median correlation was 0.47, and Garrett noted that the A.C.E. tended to give higher correlations than did other mental ability tests. He also noted that the correlations were higher for students in professional schools than for general students in university. The studies show that the average of several different mental ability tests gives higher correlations with university marks than does any one test alone. Other studies indicate that mental ability tests taken as early as the fourth grade predict university success nearly as well as those taken in the last year of high school. Finally, Garrett noted that "there is a higher correlation between intelligence test scores and later college grades for those scoring high in intelligence than for those scoring average or low."

Other Factors

The so-called aptitude tests correlate with university marks at slightly lower levels than those quoted for mental ability. The median for twenty-eight correlations was 0.43. Personality and character traits may correlate with university marks with coefficients from 0 to 0.60, with most correlations from 0.20 to 0.30. Interests as measured, and age, appear to have some relationship to university marks.

Conclusions

1. The wide range of correlations reported undoubtedly reflect in the particular institution the variety of factors previously mentioned: unreliability of measures, varied validity of measures, different range of talent, and different patterns of university courses.

2. Combinations of variables increase correlations. The most frequently chosen combination is high school average and mental ability. For twenty studies reported, the median r using this combination was 0.62. In general, while adding a third variable increases these correlations slightly, the increase is not worth the extra effort.

3. Since aptitude tests correlate with university marks nearly as well as do standardized achievement tests, the saving in time and cost justify their use.

4. The correlations between achievement test scores and university average, over the years, has dropped. This may be because of better guidance, better initial selection on admission, less stress by high schools on factual learning, or for other reasons. At all events, present investigators cannot hope to secure the high correlations formerly found.

It is of interest to compare Garrett's summary of the research on prediction of college success with that of Travers,⁵ who presented a scholarly paper in 1947. This paper has a bibliography of 272 items. The conclusions reached by Travers include the following:

1. Intelligence quotients measured during the grade school period provide rather poor predictions of academic achievement during that period, and, for practical purposes, are of little value for predicting academic achievement in college.

(Garrett's evidence, and the British experience with eleven plus examinations should warn against a hasty acceptance of this conclusion.)

2. Measure of various aspects of intelligence, such as verbal reasoning and quantitative reasoning, provide better predictions of academic success than are provided by measures of general scholastic ability.

(The general findings of later studies is that the Q and L scores of the A.C.E. do not predict as effectively as do total score.)

3. The best single prediction of general academic success in college is the student's high-school performance. The particular courses he has had in high school, however, bear no relationship to college success.

(This finding is in agreement with Garrett's survey.)

4. Subject-matter tests and tests of scholastic aptitude have some value in predicting success in college but they are less valid than the high-school record for this purpose. It is probable that the most satisfactory method of predicting general academic success in college is to combine a measure of high-school success with a measure of scholastic aptitude.
5. At the college level, prediction of academic success in specific subject-matter fields can be made with greater accuracy than overall predictions.
6. Motivational factors play a major role in determining academic success both in high school and college. Motivational factors which affect academic success have not yet been adequately measured.

By 1950, the extensive previous research on predicting college success had provided the framework above described. These findings have not been modified to any extent since that year.

Research Published in the 1950's

The 1952 issue of the *Encyclopedia of Educational Research*⁶ has a review of preceding work in this area. The authors note that in the United States, colleges vary so widely in their admission requirements that "any high school graduate can succeed in obtaining a degree by attending a college adapted to his ability level". This same placement phenomenon can be noted within large universities.

In large institutions the available data indicate that a given high-school graduate may have the qualifications to succeed in one college or department but not in another college or department within the same institution.

⁵R. M. Travers, "Significant Research on the Prediction of Academic Success", from W. Donahue, C. Coombs, and R. Francis, *The Measurement of Student Adjustment and Achievement*, 1949.

⁶L. Cain, J. Michaelis, and A. Eurich, "Prognosis", from *Encyclopedia of Educational Research*, pp. 878-892.

This has led investigators to try to predict, instead of some hypothetical overall "college success", the likelihood that the individual will succeed in one subject or group of subjects rather than in another subject or group of subjects (differential prediction). The summary provided by these authors confirms the conclusions from previous research.

High school marks, achievement tests, and mental tests are the best single predictors of success, and more valid predictions are obtained when these prognostic measures are used together or in combination with other measures. However, even the most effective of these combinations do not correlate high enough to make individual prediction with any certainty for all cases . . . Among the reasons for the rather low accuracy of prediction are: (a) the low reliability of college marks; (b) failure to devise accurate measuring instruments of personality characteristics that contribute to college success; (c) the enormous variation in standards from one college to another.

In the 'fifties, the emphasis in predicting college success swung to differential prediction and to the measurement of personality and character traits presumably important for college success. The *Review of Educational Research* includes an article (1953) by Gardner⁷ which reviews attempts to relate motivational and personality factors to achievement, without appreciable success; and notes that predictive studies involving achievement tests most frequently are aimed at differential prediction in the sense of attempting to predict success in a specific curriculum. The April 1954 issue of the same journal contains an article⁸ which notes the continued trend toward differential prediction, and a continued search for personality and character measures to add to the intellectual-cognitive predictors previously used. In this article, Hastings and McQuitty record little uniform success in increasing predictive efficiency. Finally, the October 1954 issue of the same journal carries an article⁹ which deals mostly with studies which attempt to supplement high school averages with selected achievement tests in order to improve prediction of college success.

An examination of these reviews, and of a few original studies, indicates that there is great difficulty in measuring personality and character variables presumed to be related to university success.

Canadian Studies

At study by W. G. Fleming on the prediction of university success from Ontario Grade XIII results¹⁰ is most applicable to the Alberta

⁷E. F. Gardner, "Development & Applications of Tests of Educational Achievement in Schools and Colleges", *Review of Educational Research*, (Volume 23, No. 1), pp. 85-101.

⁸J. T. Hastings and J. V. McQuitty, "Use of Tests in Educational Personnel Programs", *Review of Educational Research*, (Volume 24, No. 2), pp. 166-171.

⁹Edward S. Jones and Gloria K. Ortner, "Articulation of High School and College", *Review of Educational Research*, (Volume 24, No. 4), pp. 322-330.

¹⁰W. G. Fleming, "Factors Affecting the Predictive Accuracy of Ontario Grade XIII Results", *Bulletin No. 16*.

scene. He found correlations between Grade XIII average mark and General Course university average mark of 0.46, and with Honour Course average marks, 0.59. The factors which affected predictive accuracy of the Ontario Grade XIII results are illustrated in the following quotation:

In theory, it should be possible to predict with a high degree of accuracy from the Grade XIII average alone what university average will be obtained by a girl of seventeen or eighteen who does some of her Grade XIII work in Grade XII, who writes all the rest of her Grade XIII papers in the succeeding year without failures, who comes from a school with a highly favourable environment in a community of high economic level, who lives at home while attending university, and who enters an Honours Course.

Fleming also found that Grade XIII marks were as good for prediction as any device currently employed in U.S.A.; that Grade XIII French predicted university French reasonably well; that Grade XIII Mathematics predicted university Mathematics not quite so well; while the corresponding predictions for Science and English were poor. The follow-up of Fleming's work in what is commonly called the Atkinson Study, may, when results are published, be of considerable value to Alberta.

An interesting report by Conway and Brown¹¹ described a method used to scale the British Columbia Departmental Examinations. This method, in determining the proportion of students who shall pass, takes into account the ability level of the school enrollment in a course. As the authors state,

The effect of this selective scaling has been to increase the number of successful students with I.Q.'s above 110 and to decrease the number with I.Q.'s below that level. . . Immediately after the new scales were introduced, gross failure rates in the first year at the University of British Columbia decreased from 30 per cent to 24 per cent. It is believed that more efficient selection at the University Entrance level has been at least partially responsible.

Correlation Factors	Pass Course	Honours Course
Grade XIII average and first year university average	0.50	0.54
Grade XIII average and second year university average	0.36	0.47
Grade XIII average and third year university average	0.39	0.27
First year university average and second year university average	0.65	0.62
First year university average and third year university average	0.60	0.46
Second year university average and third year university average	0.65	0.47

¹¹C. B. Conway and Ellen L. Brown, "The Establishment of University Entrance Standards in Required and Optional Subjects", *Canadian Education*, (Volume XI, No. 2), March 1956.

A report by Fleming¹² on work done on the University of Toronto Arts class of 1949 (643 students, Table above) provides some correlations of interest for comparisons with those found at Alberta.

At the University of Alberta, a limited number of theses and student projects supply data on matriculation problems. Acroyd and Roberts¹³ studied 422 Alberta Grade XII matriculants of June 1949 who registered in the University of Alberta in September 1949. They found this group constituted approximately 60% of the 1949 freshmen, and that their university performance was better than that of the remaining 40%. Students who completed high school in three years obtained higher Grade XII averages, repeated fewer subjects in Grade XII, and enjoyed greater academic success at the University of Alberta. (Fleming discovered similar relationships in Ontario. It is likely that such students are more able.) Acroyd and Roberts estimate that half the matriculants of any one year enter the University of Alberta that year. (The basis of matriculation has since changed and the figure is now higher.)

In 1954-55 Fitzpatrick¹⁴ studied students registered in engineering at the University of Alberta. He found for 253 students that the correlation between Grade XII average and first year university average was 0.58, and between Grade XII math-science average and university average 0.67. Correlation between the A.C.E. Psychological Examination and first year university average was 0.23. When he segregated students who entered directly from Grade XII, he found that the correlations reported were higher. For 151 such students, Grade XII average correlated with first year university average 0.61, and math-science average correlated with university average 0.71. Some interesting urban-rural comparisons were found: 60% of the engineering students took Grade XII in cities, although cities (in 1951) made up only 36% of Alberta's population, and students from the cities averaged higher on A.C.E. but lower in first year university marks.

Fair¹⁵ studied 100 Alberta Arts and Science freshmen of the year 1953 who continued on to 1956 and took all the tests he was concerned with. He found the following correlations, which roughly parallel those of Fleming for Ontario.

¹²W. B. Fleming, "Survey of Scholastic Results of the Class Entering Arts, University of Toronto, 1949", Information Series No. 2.

¹³A. O. Acroyd and W. G. Roberts, *A Study of the Post-School Occupations of Students Who Graduated With University Matriculation From Alberta High Schools In 1949*, unpublished M.Ed. Thesis, Faculty of Education, University of Alberta.

¹⁴A. B. Fitzpatrick, *Prediction of Success in First Year Engineering*, unpublished M.A. Thesis, Department of Psychology, Faculty of Arts and Science, University of Alberta.

¹⁵Donald C. Fair, *Predicting Academic Success at the First and Third Year Levels of University*, unpublished term project for Psychology 59, Department of Psychology, Faculty of Arts and Sciences, University of Alberta.

A.C.E. Psychological Examination with Grade XII average	0.56
A.C.E. Psychological Examination with university first year average ...	0.40
A.C.E. Psychological Examination with university third year average	0.31
Grade XII average with university first year average	0.64
Grade XII average with university third year average	0.41
University first year average with university third year average	0.69

Conclusions

The following conclusions appear to be warranted by the data presented.

1. Prediction of university success (and therefore selection of university candidates) is affected by (a) reliability and validity of university marks; (b) reliability and validity of the measures used to predict university success; (c) the range of talent of those admitted; (d) varying patterns of courses within the university. Since varied combinations of these factors will be found for each university, specific local studies are indicated.

2. In rank order, measures which have been found to predict university success, with median correlations between the measure and university marks, are:

(a) high school average	0.56
(b) achievement tests	0.49
(c) scholastic (mental) ability tests	0.47
(d) aptitude tests	0.43

3. Combinations of high school marks with other measures improve prediction of university success. The median correlation of a combination of high school average with a scholastic (mental) ability test is 0.62 for twenty studies.

4. Personality and character traits, which presumably influence prognosis of university success, have not been accurately identified and measured. Further research is proceeding in this area.

5. There is a trend toward differential prognosis of university success, accompanied by differential admission requirements.

6. The best of present predictors of university success do not permit with any certainty prediction for the individual student.

A few specific conclusions based on the Canadian studies are:

7. The Grade XII mathematics-science average predicts university engineering marks better than does the total Grade XII average (Fitzgerald).

8. Grade XII Mathematics or French predicts university Mathematics or French better than does the Grade XII average (Fleming).

9. Prediction is better for students who take only three years to complete grade X-XII and proceed directly to University than for those taking four or more years (Acroyd-Roberts, Fitzpatrick, and Fleming).

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FURTHER EVIDENCE ON COGNITIVE FUNCTION FLUCTUATION

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1. *The Problem*

It has been noted previously—C. C. Anderson (1958)*—that factor analysis can be used to test for evidence of function fluctuation, a term originally coined by Thouless (1936) to refer to “day-to-day quantitative variation in the function tested”. (1936, p. 326) Such evidence will appear when the intercorrelations between a series of parallel tests administered each day to the same subject show a decline with increase in time interval between testing. In this case the highest correlations occur between the most proximate testing occasions, the lowest between the least proximate testing occasions. When this matrix of correlations is factorised, over and above the general factor there appears a factor, bipolar in its unrotated form, which contrasts the first with the second half of the testing occasions. If this bipolar factor is significant, it might constitute evidence of function fluctuation.

This was originally pointed out by Burt (1917), but Slocombe (1926) indicated (in fact he thought, quite erroneously, that he had proved as much) that such a factor could be the product of ‘practice effect’. By this term he meant that there was a considerable variance in gain scores between any two tests and that these gain scores were positively correlated (giving a general factor) between testing occasions. For example, he envisages one subject gaining consistently while another shows little sign of improvement, and this is taken to explain the decline in correlations. This is a fundamental mistake. As J. E. Anderson (1939) has clearly indicated, using a statistical model, the decline in correlation will appear only if the intercorrelations between gain scores on different occasions show no evidence of a general factor and are uncorrelated with previous level score. In other words, the practice effect has to be differential¹ between subjects *and* testing occasions if a decline in correlations is to be observed.

It seems clear that such a practice effect does occur. Woodrow (1938a) (1939c), studying the factorial structure of gain scores,

*The bibliographical format in this article is that favored by the Cambridge University Press.

¹This term has no relationship with Peel’s (1952) ‘differential practice’ which means the variance of average practice increases in score after regression effects have been partialled out by Peel’s own method.

found no general improvement factor. However there is no evidence, as C. C. Anderson (1958, p. 39) has indicated, that differential practice consistently decreases correlations, and indeed Woodrow (1938b) has reported that less than half his experiments show such a decrease. This means that we can never be completely certain that differential practice is not responsible for a decline in correlations with increasing time interval between testing, a point ignored by many researchers and consequently the interpretation of their results is difficult.

2. Previous Research

Woodyard (1926), in an attempt to discover the effect of time interval upon reliability coefficients, reported matrices of intercorrelations between repeated tests of intelligence, educational and aptitude tests given to different numbers of pupils and students. The intercorrelations between ten applications of a handwriting test (1926, pp. 41-42) to children aged 13 years show a marked decline with time. A striking way of illustrating this is to average all the correlations between tests that have been administered at one remove from each other— $r_{1,2}$, $r_{2,3}$, $r_{3,4}$, $r_{4,5}$, $r_{5,6}$, $r_{6,7}$, $r_{7,8}$, $r_{8,9}$, and $r_{9,10}$. Then correlations are averaged between tests that have been administered at two removes from each other— $r_{1,3}$, $r_{2,4}$, $r_{3,5}$, $r_{4,6}$, $r_{5,7}$, $r_{6,8}$, $r_{7,9}$, and $r_{8,10}$. Correlations between tests administered at progressively greater removes are averaged until the last correlation, $r_{1,10}$, at 9 removes is reached. The method is crude because progressively smaller numbers of coefficients are averaged on each successive occasion, but it gives a clear indication of the decline in coefficients with time.

TABLE 1
EFFECT OF TIME ON RELIABILITY COEFFICIENTS
(Handwriting Test)

Removes	1	2	3	4	5	6	7	8	9
Average r	.713	.642	.589	.588	.500	.475	.440	.320	.360

Miller's (1933) study is modelled on that of Hirsch (1930). Miller gave five parallel group intelligence tests between 9 and 12 o'clock on the same morning to children whose median age was $13\frac{1}{2}$ years. The intercorrelations between the tests show no evidence of a decline. This is scarcely to be wondered at since the complete testing time is so short and the effects of general fatigue and boredom must have been considerable.

Perl (1934) tested 60 subjects whose average age was 10 years. She gave them a test of 'making gates', Whipple's symbol-digit test,

a Turkish-English vocabulary test, and an Arithmetic test, twenty trials of each being made. The first was omitted as a shock-absorber, and then the first, third, sixth, twelfth and nineteenth trials were intercorrelated. The four matrices show a decline in coefficients. An unrotated Thurstonian analysis gave familiar signs—the first factor loading increased to the middle trial and then decreased, and the second factor loadings moved from a relatively high positive value through zero to a relatively high negative value. Perl labels the first factor 'proximity' and the second 'practice', by which she appears to mean differential 'test sophistication' (1934, pp. 211-212). This is unsatisfactory and unfortunate because, if successive mean test scores had been given and if there had been no evidence of group practice effect—a likely event since practice had been given before and between the tests on which the scores were intercorrelated and the effect of practice might have been absorbed early in the testing sessions—then function fluctuation might plausibly have been adduced to explain the results.

Edgerton and Valentine (1935) gave 64 subjects 10 trials on a mirror-drawing test. Although no intercorrelations are published, their second factor, the loadings on which run systematically from $+0.4$ to -0.4 , is evidence of a decline in correlations with time. No interpretation is offered.²

Hertzman (1939) provides the intercorrelations from one of his own studies in which Thurstone's Substitution test was administered to a class of students. Each student took 30 trials which were condensed into 15 by adding the scores on immediately contiguous trials. The distribution of scores on each of the 15 trials was scaled to a mean of 50 and a standard deviation of 15, and the 55 subjects with the lowest, and 55 with the highest, indices of crude variability (variance of scores over the 15 trials) were isolated. These two groups will be designated L.V.G. (lowest variability group) and H.V.G. (highest variability group). Intercorrelations between the 15 trials were calculated for each group separately and showed the familiar sign. Hertzman draws attention to the decline in correlations (most marked in the H.V.G.) and to the greater homogeneity of the correlations and factor loadings of the L.V.G.

The weakness in this experiment is clear. Hertzman believed that he was dealing with 'trait variability' or function fluctuation in Thouless's sense, but his measure of this is the intra-trait intra-individual variance for each person. This is a measure of crude variability and it might be argued that, because of this, the H.V.G. will include those with the largest amounts of error in their scores, and hence the intercorrelations of the various performances by

²Paulsen's (1935) relevant contributions are discussed in C. C. Anderson (1958).

members of this group are bound to be less than the intercorrelations of the L.V.G., and the decline in the coefficients with time correspondingly steeper. Nevertheless it should be noted that, even in the L.V.G. where the effect of errors of measurement is least, there is evidence of a significant decline in correlations, although there is no indication of the extent to which differential practice affected the results.

Woodrow (1938a), (1938b), (1938c), (1939a), (1939b), (1939c) made an extended survey of the influence of practice on inter-test correlations and factor loadings. He (1938a) gave 56 subjects 39 days of practice in each of 7 tests, addition, subtraction, spot-patterns, anagrams, cancellation, the estimation of length and making gates. Three end tests were taken before and after practice—artificial language, form analogies, and verbal analogies—and others, including verbal and non verbal intelligence tests were taken either before or after. Thirty three variables were intercorrelated, 21 of which were initial, final, and gain scores in the practice tests, and 12 scores on the end tests. Woodrow noted the marked changes which occur in factor loadings with practice, but his account of practice is unusual. Vernon's (1952) description of practice in terms of 'test sophistication' is widely accepted.

"... any experience of tests does have a minor general effect . . . It improves confidence and shows pupils the need to take careful account of the instructions, to work quickly, to be alert to tricky items, to omit difficult ones, and so forth." (1952, p. 7).

Woodrow, however, sees practice as involving a change in the pattern of cognitive abilities.

"In general these changes with practice in the factor loadings mean that the quantitative pattern of abilities determining goodness of performance changes with practice, i.e. a performance after practice is likely to depend for its success more on one ability and less on another than it did initially. Such a change must mean a change in the mode of operation whereby the subject carries out the task he has been instructed to accomplish." (1938, p. 227).

This is an explanation of the effect of practice in terms of functional change rather than function fluctuation, although Woodrow (1939b) also suggests "the possibility that with practice there may have been increases in the degree to which the subjects brought their verbal intelligence into play" (1939b, p. 185), which is very close to C. C. Anderson's (1958) explanation of fluctuation.

The major criticism of Woodrow should be directed against one of his assumptions. He finds that practice causes changes in factor loadings. He assumes that these changes necessarily and only imply some functional changes in the kind of abilities being measured as the testing proceeds—that performances on the final score depends on an ability (or pattern of abilities) which, if there is an observed

decrease in correlations with time, would tend to be negatively correlated with the ability underlying performance in the initial tests. Such a speculation is unwieldy, implausible and possibly even unnecessary. The effect of practice would be slight after so many test administrations and the change in factor loadings might be explicable, at least in part, in terms of function fluctuation, a point which cannot begin to be decided since successive means on test performances were not provided.

Of course differential practice effect and function fluctuation, as two explanations of the decline in correlations with time-interval between testing, are not mutually exclusive because the truth of one does not necessarily imply the falsehood of the other. Nevertheless it should be possible to design an experiment in which the effects of practice were eliminated as determinants of the pattern of scoring, so that any decline in correlations might plausibly be attributed to the influence of function fluctuation.

This might be done firstly by so saturating the subjects with preliminary practice that differential practice could not be considered a feasible explanation of any pattern revealed in the inter-correlations between successive tests which had been administered after the period of preliminary practice. Such an extensive testing with complete group cognitive tests has never been contemplated and there are no published results for analysis.

Secondly recourse might be had to the intercorrelations between successive parallel tests provided the group means of performance on each successive test are given. These means can be surveyed to determine the point at which the effects of practice diminish and beyond which subsequent means are homogeneous. Then the matrix of intercorrelations between scores drawn from the testing occasions which show homogeneous means could be factorised. Any observed evidence of a decline in correlations with time—if, for example, the first general factor showed its heaviest loadings in the middle tests, and if the significant second factor, in its unrotated form, tended to balance the first against the second half of the testing—could be interpreted as the product of function fluctuation.

This account is based explicitly on the assumption that where there is no increase in mean score from occasion to occasion, there can be no differential practice effect. It can be argued against this that it is theoretically possible for successive means to stay stationary and yet for differential practice effect to take place: for example, some members of a group might score more on one testing than another, while an equal number score equivalently below the means. However, these 'negative movements' cannot be rubricised as

‘practice effect’ and the possibility of such a wide variance in difference scores can be discounted in practice.

3. *Present Research*

In the first experiment 97 children worked 8 parallel verbal intelligence tests within a period of 6 to 8 weeks. In the second experiment 10 parallel verbal intelligence, 10 parallel English, and 10 parallel Arithmetic tests were administered to 55 children. The average age in both experiments was 10½ years. The inter-correlations between test scores within each function are presented below.

TABLE 2
INTERCORRELATIONS BETWEEN TESTS IN
FIRST EXPERIMENT
Verbal Intelligence

	2	3	4	5	6	7	8
1	.894	.898	.890	.867	.844	.834	.860
2		.921	.920	.877	.849	.870	.833
3			.882	.900	.902	.874	.878
4				.916	.919	.893	.888
5					.884	.890	.872
6						.866	.884
7							.867

TABLE 3
INTERCORRELATIONS BETWEEN TESTS IN
SECOND EXPERIMENT
Verbal Intelligence

	2	3	4	5	6	7	8	9	10
1	.900	.677	.691	.677	.712	.635	.620	.613	.675
2		.749	.608	.665	.728	.691	.755	.618	.740
3			.570	.694	.659	.690	.685	.568	.717
4				.567	.546	.634	.594	.550	.609
5					.658	.659	.600	.598	.614
6						.677	.690	.614	.658
7							.770	.692	.806
8								.678	.764
9									.722

English									
	2	3	4	5	6	7	8	9	10
1	.751	.693	.740	.729	.786	.627	.669	.535	.768
2		.797	.785	.767	.768	.631	.754	.571	.734
3			.799	.789	.743	.689	.686	.606	.688
4				.886	.832	.778	.869	.823	.821
5					.851	.792	.865	.748	.906
6						.813	.859	.668	.853
7							.784	.672	.800
8								.734	.839
9									.759

Arithmetic									
	2	3	4	5	6	7	8	9	10
1	.744	.837	.746	.790	.797	.738	.746	.708	.769
2		.824	.706	.770	.656	.691	.559	.667	.770
3			.764	.854	.733	.727	.721	.735	.824
4				.847	.798	.754	.747	.762	.826
5					.782	.892	.871	.802	.678
6						.784	.826	.742	.832
7							.841	.750	.770
8								.752	.804
9									.821

There is a certain amount of evidence of decline in correlations with time and consequently each matrix was factorised, the sets of factor loadings being presented below together with the appropriate means of scores on the successive testing occasions.

TABLE 4

FACTOR ANALYSIS OF INTERCORRELATIONS

FIRST EXPERIMENT

Unrotated Loadings

Tests	K ₁	K ₂	Means
1	.925	— .106	107.1
2	.943	— .178	110.3
3	.956	— .128	110.2
4	.965	.084	110.8
5	.944	.062	110.5
6	.935	.107	109.9
7	.923	.090	112.1
8	.923	.085	113.2

TABLE 5
FACTOR ANALYSIS OF INTERCORRELATIONS
SECOND EXPERIMENT

Verbal Intelligence
Unrotated Loadings

Tests	K ₁	K ₂	Means
1	.866	— .404	110.7
2	.888	— .188	113.5
3	.814	— .067	114.5
4	.718	— .077	116.4
5	.774	— .137	117.3
6	.804	— .049	115.9
7	.859	.228	115.4
8	.840	.188	115.2
9	.766	.196	116.8
10	.868	.251	117.8

English
Unrotated Loadings

Tests	K ₁	K ₂	Means
1	.806	— .281	102.7
2	.843	— .306	107.4
3	.827	— .188	106.6
4	.942	.054	106.9
5	.942	.081	109.
6	.918	— .025	109.6
7	.836	.102	110.
8	.903	.123	110.9
9	.788	.365	108.8
10	.919	.098	110.7

Arithmetic
Unrotated Loadings

Tests	K ₁	K ₂	Means
1	.871	— .112	100.
2	.815	— .312	95.9
3	.901	— .313	106.1
4	.879	.034	107.3
5	.927	— .021	107.6
6	.883	.176	106.8
7	.880	.051	109.3
8	.876	.228	108.2
9	.851	.106	106.6
10	.903	.173	108.5

None of the bipolar factors is significant by any of the accepted tests, and consequently the decline in correlations observed in all the matrices is not sufficiently steep to require explanation in terms of function fluctuation or differential practice. Therefore, it would be a waste of time to factorise the correlations between scores from the second to the terminating testing occasions in which the means are homogeneous.

The general conclusion is negative: that the interpretation of tests derived by factor analysis for evidence of cognitive function fluctuation is ambiguous, and that an experimental attempt to remove the ambiguity by eliminating one of the two relevant hypotheses has proved unsuccessful. Future work on function fluctuation must use other techniques.

4. Implications

Nevertheless there is a consistent tendency in all functions for correlations to decline somewhat with increase in time-interval between testing, a decline which might have been significant and marked if the testing had been extended or if larger numbers of subjects had taken the total tests. The results suggest that we must revise our attitude to the stability of scores on cognitive tests. Specifically the I.Q. is not constant. Psychology is not an exact science like physics in which complex phenomena can be reduced to mathematically clean and simple conceptions. We cannot say: "This is a person's I.Q." We must say: "This is an I.Q. obtained under certain conditions and it may possibly vary with these conditions".

This does not mean that behaviour is completely unpredictable. Measures of test reliability calculated even over periods of many years (provided the original test is not given at too early an age) are always highly significant. It merely means that the observed incidence of function fluctuation (or in this case possibly differential practice effect) relatively weakens good prediction of later attributes of behaviour if the original scores are drawn from a solitary testing occasion.

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A REVIEW OF ACCELERATION PROCEDURES FOR GIFTED PUPILS IN REGULAR AND SPECIAL CLASSES

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A half-century of experimentation in the education of gifted children has developed a number of practices that have changed little in recent years. Acceleration is still evident in regular classes and in special groups. Moderate acceleration appears to be gaining favor as new studies yield favorable findings. The other outstanding procedure is enrichment which seeks to organize learning situations through provision of experiences in greater variety and at a more advanced level. This may be done in the regular classroom or in various forms of grouping such as special classes, special schools, or on the basis of special interests or variations in achievement. Enrichment will be discussed in a subsequent paper.

Many schools provide both acceleration and enrichment. Special grouping facilitates such enriched acceleration which is more likely to be found in high schools than in elementary because pupils' programs in high school are more differentiated according to their aims and interests, thus providing a basis for further differentiation according to ability. Special classes imply some form of segregation. This may involve separating the pupils on a full-time basis for acceleration or enrichment. In some schools the separation is on a part-time basis whereby pupils take some of their work in regular classrooms and come together in special groups for half a day or for only a few periods a week in the pursuit of a special interest.

It is proposed to offer in this paper a bibliographical survey of the opinion, practice, and experimental studies pertinent to acceleration.

Acceleration Opinion of Educators

Acceleration is an administrative arrangement that implies grade skipping or progress through sequential but rapidly paced learning. Acceleration answered the emergency demand for manpower during the war and since then the emphasis upon acceleration has increased. Worcester¹ says "There is evidence to show that gifted children who are held back with those of their chronological age are more likely to develop behavior and personality problems than those who are accelerated. There is a danger also of promoting

¹D. A. Worcester, *The Education of Children of Above-Average Ability*, 1955, p. 36.

lazy and careless work habits among those who are educationally beyond their classmates but who are held back with them." In the twenties the studies of Ayres, Thorndike, Goodard, Whipple, and Terman emphasized the extent to which the grade system was ignoring individual differences. Multiple tracking and double promotions were attempted as well as grade skipping although it is supposed to aggravate the child's problem of social adjustment and leave gaps in his academic knowledge. The Educational Policies Commission² indicates that such a practice is dangerous to health. Martens³ adds that "skipping" may cause children to encounter difficulty in later grades. Witty and Bloom⁴ suggest that acceleration is generally in disfavor and a Connecticut State committee⁵ states that acceleration endangers the opportunities for enrichment and creative experience. In the Promotion Policies Report of Alberta⁶ a low frequency of acceleration is noted and the Hope Report⁷ suggests that "as a general principle acceleration of the progress of pupils should be avoided as it separates them from the social group." Hildreth⁸ does not recommend acceleration by skipping in the lower grades, but she does suggest that in the upper grades and in high school moderate acceleration may not be detrimental, provided physical and social maturity is evident. The Connecticut Committee⁹ does not think children should be separated from their peers, even though it is commonly believed that child development is more wholesome if carried on with the chronological age group. But it is significant that the age span in the ordinary grade is as much as four years in many classrooms. A Texas Workshop Committee¹⁰ concluded that acceleration does not seem advisable for all gifted children and emphasized that physical, mental, social, and emotional development must be considered in any accelerated program. Martens¹¹ says that the unusually bright child can and should advance through school faster than the average child, but that his pace should be determined on "the basis of his mental capacity, plus his physical development, plus his social maturity . . . each of these is an important factor in guiding the whole child." And the Connecticut Committee¹² joins in saying that acceleration

²Educational Policies Commission, *Education of the Gifted*, 1950, p. 50.

³Elise H. Martens, *Curricular Adjustment for Gifted Children*, 1946, p. 20.

⁴Paul Witty and Samuel Bloom, *Education of Superior High School Students*, 1955, p. 21.

⁵Connecticut Committee Report, *Education for Gifted Children and Youth: A Guide for Planning Programs*, 1956, p. 27.

⁶Promotion Policies in Alberta: Interim Report, 1955, p. 7.

⁷Report of the Hope Commission on Education in Ontario, 1955, p. 79.

⁸Gertrude Hildreth, Florence Brumbaugh, and Frank Wilson, *Educating Gifted Children at Hunter College Elementary School*, 1952, p. 260.

⁹Connecticut Committee Report, op. cit., p. 27.

¹⁰Curriculum Enrichment for Gifted Elementary School Children in Regular Classes, 1955, p. 12.

¹¹Martens, op. cit., p. 19.

¹²Connecticut Committee Report, op. cit., p. 27.

should only follow after careful consideration of health reports, cumulative records, and reports of psychologists. Laycock¹³ warns that more than two grades of acceleration is likely to place less mature children with those who possess a greater degree of motor coordination. The same emphasis on maturity is noted by Sumption and others:¹⁴

No universal rule can be laid down governing the amount of acceleration that is desirable. All cases must be weighed against the background of the child's personality. Moderate acceleration, particularly in high school and college, is not inadvisable when the individual is socially and physically mature.

Terman indicated that there was no final rule for acceleration. But his studies led him to conclude:¹⁵

There is reason to believe that the influence of school acceleration in causing social maladjustment is greatly exaggerated . . . It is our opinion that nearly all children of 135 I.Q. or higher should be promoted sufficiently to permit college entrance by age seventeen at latest, and that a majority in this group would be better off to enter at sixteen.

Terman's genetic studies of acceleration in elementary grades revealed little evidence of maladjustment. His follow-up studies in 1925 and again in 1930 indicated that the advantages of acceleration were still in evidence and that there had been no narrowing of interests. The twenty-five year follow-up study in 1946 revealed that those who had graduated a year earlier than non-accelerates did better work in university and took more work there as well, and later held a proportionately larger number of positions in the professional field. The volume entitled,¹⁶ "The Gifted Child Grows Up" gave much evidence supporting acceleration which had suffered eclipse in the twenties and thirties. Parkyn¹⁷ mentions that, in 1943, the Educational Policies Commission recommended as an emergency measure the admission to college of highly selected students who had finished Grade XI, and that Boardman, after summarizing many studies on the subject, agreed that there was considerable support for the recommendation. Witty and Pressey favor moderate acceleration. Baker,¹⁸ however, asserts that accelerated pupils may absorb only the intellectual phases of subject matter without much realization of the cultural, social, or political significance of the material. The Hunter College Elementary School¹⁹ expresses the view that, in

¹³Samuel R. Laycock, "The Bright Child in School", *New Schools for Old*, p. 30.

¹⁴Merle R. Sumpton, Dorothy Norris, and Lewis M. Terman, "Special Education for the Gifted Child", *The Education of Exceptional Children*, 1950, p. 277.

¹⁵Lewis M. Terman and Melita H. Oden, "The Stanford Studies of Gifted", *The Gifted Child*, 1951, p. 43.

¹⁶Lewis M. Terman and Melita H. Oden, "The Gifted Child Grows Up", *Genetic Studies of Genius*, Vol. IV, 1947.

¹⁷G. W. Parkyn, "Children of High Intelligence", *Educational Research Series No. 30*, 1948, p. 134.

¹⁸Harry J. Baker, *Introduction to Exceptional Children*, 1953, p. 290.

¹⁹Hildreth, *op. cit.*, p. 260.

agreement with the conclusions of the Speyer School experiment, gifted children can do the elementary work in two years less time but acceleration is not favored as it is felt there are many other areas of learning that can be explored without moving into more advanced work. Sumpton²⁰ points out that placing young pupils with older ones imposes upon them a physical and social handicap and fails to provide opportunity for them to have leadership experience, although she notes that time is saved and that the children have new learning situations with others of similar mental ages. Bentley²¹ submits that acceleration increases motivation, discourages dawdling, and allows the student to finish his professional training earlier. The California State Advisory Council on Educational Research makes this statement:

Acceleration up to three or four semesters between grades one and twelve has been found valuable and not socially deleterious for the top one per cent of the school population in studies conducted in the East. While other factors such as physical and social development need to be taken into consideration, it is evident that a significant proportion among this top one per cent are not currently receiving optimum school opportunities because of an educational lockstep . . . acceleration is the easiest way of taking care of the problem of some gifted children, and that many gifted children can well use the extra year thus gained for study in college or graduate work.²²

Trusler²³ has recommended more frequent use of acceleration and Freeman²⁴ defends acceleration as a general educational policy but indicates that social problems involve better school organization so that enrichment is also provided.

There is always an educational objective to bear in mind; if education is a business of learning the course content then, as Sumpton says, if the child can learn it faster he should be accelerated. But if education is concerned about the development of habits, attitudes, and of social experiences then enrichment for the gifted should give more educational maturity. Many speak of a curriculum as having a certain content to be mastered and that the gifted should master it faster. But the superior pupils should get more from the curriculum than others. As Pressey says:²⁵

. . . even the sequential subjects are not so narrowly defined that the amount to be learned at each stage is all that can be learned by the average child or all that should be learned by an intelligent child.

Acceleration Programs in Practice

Adams notes that able students of the Ben Blewitt School in St. Louis take the three grades of junior high school in less than

²⁰Merle R. Sumpton, *Three Hundred Gifted Children*, 1941, p. 28.

²¹John Edward Bentley, *Superior Children*, 1937, p. 125.

²²Research Résumé, No. 1, *Annotated Bibliography; Gifted Child Education*, 1956, p. 2.

²³J. W. Trusler, "Pupil Acceleration in Elementary Schools", *Grade Teacher*, Vol. 67, Oct., 1949, pp. 96-98.

²⁴Walter S. Monroe, editor, *Encyclopedia of Education Research*, 1950, p. 508.

²⁵Sidney L. Pressey, *Educational Acceleration: Appraisals and Basic Problems*, 1949, p. 135.

three years.²⁶ Acceleration has been practised for many years in a Minnesota school where Grades VII and VIII have been taken in one year. The Report of the Baltimore School Board²⁷ states that the acceleration effected in four of its junior high schools "is not excessive when the individual children are carefully selected on the basis of maturity and social adjustment." In Hamilton, Ontario, the Unit system of Promotion²⁸ makes rapid progress possible for the more able students. In Ottawa the most able pupils from Grade II are accelerated so that they may finish Grades III and IV in one year.²⁹ In Toronto acceleration is effected in many of the elementary schools by the completion of the work of Grade II, III, and IV in two years.³⁰ The literature does not reveal many examples of acceleration in the first year of a child's school life. But Calgary has instituted a plan whereby able pupils may finish Grade I in eight months with a view to finishing the first three grades in two years.³¹ In San Diego acceleration of elementary pupils is limited, according to Roberts,³² to about one year. In the junior high schools, able pupils complete Grade VII and VIII in one year. Acceleration is definitely more frequent in the junior high schools and is becoming more common in those senior high school where cooperation is effected with colleges for entrance with advanced standing. Witty,³³ in 1949, received replies to a questionnaire from twenty-nine towns and cities to the effect that acceleration was practised for superior high school students with a limitation of one or two years. Many school boards have commended acceleration in their programs. Some favor more rapid progress in the elementary school, though the practice is more common at the junior and senior high school levels.

Experimental Studies

Pressey cites studies made over a number of years of young college entrants at Harvard, Columbia, Minnesota, and Northwestern Universities.³⁴ The studies point to a common conclusion that the young entrants had a larger proportion of able students, took more graduate work, and achieved more honors. The youngest entrants had the highest ability. He also reports studies made by Keys, Gray, Husband, and Silverman indicating evidence that young college

²⁶Fay Adams and Walker Brown, *Teaching the Bright Pupil*, 1930, p. 58.

²⁷Baltimore Bulletin of Education, Volume XXXI, No. 5, June, 1954, p. 5.

²⁸Hamilton Board of Education Report on "The Unit System of Promotion in the Public Schools of Hamilton," July, 16, 1954, pp. 1-2.

²⁹Ottawa Public School News, November, 1956, p. 4.

³⁰"A Study of Education for the Gifted Child in Public School", Toronto Public School Board, 1955, p. 15.

³¹"Report on Division 1 Accelerated Pupils of Calgary Public Schools", January 9, 1956.

³²Helen E. Roberts, "Current Trends in the Education of Gifted", 1954, p. 55

³³Paul Witty, "Nature and Extent of Educational Provisions for the Gifted Pupil," *The Gifted Child*, 1951, p. 202.

³⁴Pressey, *op. cit.*, p. 7.

entrants participated in college athletics, social activities, and positions of leadership without any sign of emotional maladjustment. A study³⁵ at the University of Buffalo showed that fifty-seven entrants less than seventeen years of age equalled fifty-seven control students two years older in average college marks and percentage graduating with distinction, and excelled the older students in mathematics and language. These conclusions give support to the arguments put forth for early admission to college or entrance with advanced standing. Witty favors moderate acceleration and notes that the University of Chicago sets up its entrance requirements so that the able students may enter after two years of high school.³⁶ Hildreth asserts that:³⁷

... test results prove that the senior high year and college freshmen overlap ninety per cent. The gifted child could easily skip one of the years. Possibly eighth and ninth grades could also be combined without loss to the mentally gifted. The three years usually spent in senior high school plus the four-year college sequence could be shortened for the gifted to five or six years, especially if these years in high school and college were treated as a unit.

The Ohio State project³⁸ involved special classes for acceleration. Instead of taking five fifty-minute periods each week the superior students took one two-hour lesson each week. Sixty-five per cent of the students from this group made A's or B's as compared to twenty-eight per cent of the regular class who wrote the same examination. Matched with individual students from the regular class the accelerates showed up to advantage. In May, 1952, The Bureau of Educational Research and Measurement reported on the performance of intellectually gifted children in special classes with equivalent intellectually gifted children in regular classes. The matched pairs were tested and after fourteen months were retested and the evidence showed that the group in the special class made significantly greater gains in knowledge and its use while maintaining the expected growth in personality, value, and interest. Lorge states that:

The evidence from these valuable studies of the Bureau of Educational Research demonstrates that not only can a year be saved but that it can be saved without loss in the social values or deterioration in personal adjustment.³⁹

Lorge also reports on a study⁴⁰ by Justman of accelerated pupils in a tenth grade special progress group who achieved as well as a

³⁵Pressey, *ibid.*, p. 8.

³⁶Witty, *op. cit.*, p. 40.

³⁷Hildreth, *op. cit.*, p. 263.

³⁸E. Brock Rideout, "The Gifted Child," Reprint from *The Bulletin of the Ontario Secondary School Teachers' Federation*, Sept. and Nov., 1954, p. 12.

³⁹Irving Lorge, "Social Gains in the Special Education of the Gifted," *School and Society*, Volume 79, January, 1954, p. 6.

⁴⁰Lorge, *ibid.*, p. 5.

matched group comprised of students a year older but of similar ability.

Acceleration creates administrative problems. Pupils start new sections of work or new grades at varying times of the year and consequently the programs of many centers make no provision for acceleration. Educators, instead, commended enrichment procedures for the gifted pupils.

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BOOK REVIEW

ADMINISTRATIVE BEHAVIOR IN EDUCATION edited by Roald F. Campbell and Russell T. Gregg. New York: Harper and Brothers, 1957, pp. 547, \$6.50.

The reader may quite easily be shaken loose from administrative concepts which he would prefer to regard as secure by submitting himself to *Administrative Behavior in Education*. The book's eighteen contributors, themselves a virtual "who's who" of the field, may achieve this result not so much by supplying a completely new, "factory-fresh" line of concepts as by showing some standard ones to be inadequately defined, inappropriately founded, conflicting or out-worm. But it is primarily a constructive text: the age of educational alchemy, it is noted, is behind us. A number of guideposts are pointed out, we are shown how some persons have made a beginning, and we are handed a few tools. The student or the practitioner of educational administration may ignore them entirely or snatch at them unguardedly, at his peril.

Only by careful editing and close collaboration among so many contributors could so unified a presentation and interpretation of the accomplishments, be they only the beginnings, of the Cooperative Program in Educational Administration, be achieved. Like the CPEA—the Canadian counterpart of which is the C.E.A.-W. K. Kellogg Programme in Educational Administration at the University of Alberta—the preparation of this book was made possible by a grant from the W. K. Kellogg Foundation. It is not surprising, therefore, to find the major problem areas treated which are receiving current emphasis at the eight America CPEA centers. Some examples: development of theoretical concepts and research methods, administrator roles and conflicts, the human relations—leadership dilemma, school-community articulation, the recruitment, training and selection of administrators, and the place of component disciplines in the composite science of administration.

Seldom does the professional administrator need to be reminded—excepting when he is reading a textbook—that he operates within a system of interacting, flesh-and-blood human beings. *Administrative Behavior in Education* attempts to overcome this possible exception by starting off with two actual case studies in educational administration in chapter one. Much could have been gained, however, had the ensuing chapters made use of the real life situations of this chapter. The reviewer had completely forgotten the hustle and muscle of the steam-engine superintendent when studying Halpin's research paradigm in the fifth chapter.

If administration means getting a job done the editors have outdone themselves by presenting three major jobs: furthering the theory and understanding of administration, the practical task of administering an educational enterprise, and operating an administrator-training programme. This last task is assigned a special section in the book: Part Three—*The Professional Development of Educational Administrators*. The other two tasks are mixed together in the ten chapters comprising Part One—*Background and Setting of Education Administration*, and Part Two—*The Nature of Administrative Behavior*. That developing and understanding the theory and the practice are not assigned separate sections may reflect the wisdom of the editors. Divorcing theory from practice has very often been the accusation made of texts in the social sciences. A brief final section, Part Four—*A Professional Challenge*, contains some provocative evaluation and speculation.

That several of the contributors emphasize the need for more sophisticated research indicates the present development stage of the study of administrator behavior. Certain of their recommendations are of particular interest. Programmatic research, i.e., team studies or interlocking studies, are recommended "to reduce the incidence of episodic, disconnected studies and to stimulate the systematic cumulation of research findings." One writer deplores the large number of studies investigating the variables associated with administrator behavior to the exclusion of studies dealing with measureable changes in organization achievements as the result of administrator behavior. Elsewhere in the book he courageously cites a definitive study carried out under his direction which, it may be learned, has nothing whatever to do with ultimate organizational change. For the development of a comprehensive theory of administrative relationships the use of theoretical models is recommended, but with caution. One writer observes, "... that data used in the [mathematical] formulations are not as precise as the formulations Using mathematics in this manner, at this time, is analogous to using jet fuel in a Model T."

Little that is new, but much of continuing interest to the administrator, is found in the treatment of the administrative process. A reshuffling of what are by now standard lists of elements in the process turns up few new terms. Compare their components—decision making, planning, organizing, communicating, influencing, coordinating, evaluating—with, e.g., Gulick's POSDCORB (planning, organizing, staffing, directing, coordinating, reporting, budgeting), with Sears' planning, organizing, directing, coordinating, controlling, or with the American Association of School Administrators' planning, allocation, stimulation, coordination, evaluation. But

the discussion, if familiar, is concise (fifty pages) and is clearly related both to the task of the professional administrator and to the research paradigm advanced earlier in the book.

The success enjoyed in defining the administrator's task is not shared in the task of defining the administrator. An extensive review finds that both the trait and the situational theories of leadership offer something less than a comprehensive approach to the study of leader behavior, and that current studies are groping for acceptable criteria of administrator effectiveness.

The study of educational administration could not, of course, have developed even to its present level had it not made the fullest possible use of fellow social sciences. *Administrative Behavior in Education* amply illustrates the application of current concepts, techniques and findings of psychology, sociology, culture anthropology, political science, economics and business administration. While not always the case in the field of school administration in general, the contributions of two of these—psychology and sociology, in that order—are most apparent in this text. This is only being true to its title: it is a book on human behavior, on humans behaving within a special kind of interaction system.

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